The
VETERINARY RECORD
Founded by William Hunting, F.R.C.V.S., in 1888
7, MANSFIELD STREET, PORTLAND PLACE, LONDON, W.1. MUSEUM 6541

No. 33 AUGUST 13th, 1955 Vol. 67.
Registered for Transmission as a Newspaper *Price: 2s. post free*

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Wastage and Disease Incidence in Dairy Herds

BY
F. W. WITHERS
Ministry of Agriculture, Veterinary Laboratory, Weybridge

Introduction

IN 1949 the National Veterinary Medical Association (now the British Veterinary Association) announced a scheme proposed by its Technical Development Committee, for the collection of data on the incidence of disease. It was hoped that 200 veterinary surgeons in practice would each be willing to select about 10 clients to keep records of sickness in their dairy herds on forms designed by the committee. A number of veterinary surgeons agreed to co-operate, but on the whole there was insufficient response largely due to the fact that the average practitioner is unable to devote sufficient time to such work. A further point detracting in the long run from the value of such a method, was that herds selected by veterinary surgeons whose owners were sufficiently interested to participate would constitute a sample of mainly well-managed herds which would not be regarded as representative of counties as a whole or of the particular areas surveyed.

Before the publication of details of this scheme in THE VETERINARY RECORD, the Association had submitted them to the Animal Health Division with the suggestion that the project might be undertaken by the Ministry of Agriculture, but owing to lack of staff this was not possible at the time, and it was suggested that if the Association could show useful results from a trial survey, the matter would be reconsidered.

Early in 1950, however, a research officer of the Veterinary Laboratory became available, and it was decided to commence a pilot survey of samples of dairy herds in Surrey and Berkshire. The record cards issued to co-operating farmers were those devised by the Technical Development Committee of the N.V.M.A. although they were later revised as the result of experience in the field.

Herd Samples

At this time the dairy herds in Surrey and Berkshire were classified as follows:

	Surrey	*Berkshire*
Attested and T.T. licensed ...	420	600
Accredited and non-designated	700	700
Total dairy herds	1,120	1,300

It was decided to recruit random samples of approximately 5 per cent. of the herds in each county. That in Surrey was based on a random sample from about 270 herds which participated in the original Weybridge Mastitis Survey. By taking a random sample from this list of herds (itself a 1 in 4 random sample of the whole county) useful comparative data on mastitis would be obtained. The Berkshire sample was directly based on the complete list of dairy herds. Each list was divided into tuberculin-tested and non-tested herds and classified for size. Random samples of 1 in 4 of the Surrey list and 1 in 15 of the Berkshire list were taken to allow for wastage.. The samples were thus random (of approximately one quarter of the Surrey herds and of the whole of the Berkshire herds) and stratified for designation. A few were added subsequently which had previously been selected by private veterinary surgeons under the N.V.M.A. scheme.

These herds were recruited early in 1950 and it was originally proposed that data should be recorded from April 1st of that year. As the project developed, however, it was found advisable to commence the survey years on October 1st, thus conforming to the Milk Marketing Board's recording year.

About 70 herds in Surrey and 88 in Berkshire were originally visited and the following numbers of herds completed data for the years specified.

	Surrey	*Berkshire*	*Total*
Year ending 31.3.51 ...	63	68	131
„ 30.9.51 ...	58	64	122
„ 30.9.52 ...	55	58	113

In 1951 it was found possible to extend the scheme to Wiltshire. At that time dairy herds in that county were classified as follows.

Attested and T.T. licensed ...	1,000
Accredited and non-designated ...	2,400
Total dairy herds	3,400

Although it was not possible to recruit a 5 per cent. sample (170 herds) in one year, it was decided to draw a random sample of this size and aim at recruiting it in stages. The complete list of dairy herds was used as the basis, and this was sub-divided by designations. Random samples of 1 in 20 of the attested, T.T. licensed, accredited and non-designated herds were drawn. Of approximately 170 herds in this sample, about 90 were visited in 1951 and of these 50 completed records for the year ending September 30th, 1952. As in Surrey and Berkshire a few herds previously selected by private veterinary surgeons under the N.V.M.A. scheme were also taken over in Wiltshire.

Recording Data

The farmer or person in charge of each herd recruited was asked to keep a record card showing the name or number of each cow in the herd, her calving and service dates during the recording year and particulars of deaths, disposals and cases of sickness. The numbers of young stock and any casualties and sickness among them were also to be recorded. Veterinary surgeons were visited or communicated with acquainting them with the names of their clients who were co-operating and they were asked to assist by making entries on the record cards as necessary and by sending material in appropriate cases to the Veterinary Laboratory, Weybridge or to the local Veterinary Investigation Centre for laboratory diagnosis.

For the first two years, *i.e.*, up to September 30th, 1952, the information was transcribed on plain record cards and each year's results were totalled and analysed by hand.

A fundamental difficulty in carrying out a survey of this kind is to obtain the full data from representative random samples of farms. The co-operation of herd owners has been on the whole very good, but it was found from the outset that nearly all those refusing or unable to take part were owners of the non-designated type of herd. Furthermore, with the considerable recent progress of attestation, a number of herds in each sample which were non-designated at the commencement of the survey year, changed their status during the year. Owners wishing to become attested were more likely to co-operate than other non-designated herdowners. Further, a much larger proportion of herds with tuberculin-tested cattle was willing to continue keeping records for more than one year than was the case with other herds. These considerations undoubtedly led to the results being biased in the statistical sense in favour of the attested and better managed type, and insufficiently representative of the non-designated herds which still contained nearly half the dairy cattle in the counties concerned.

The data published in the present article relate to the years 1950-51 and 1951-52 (October 1st to September 30th in each case). It is to be regarded as the preliminary result of a pilot survey in which the methods employed rather than the data obtained were being studied. Though based on a somewhat selected sample and subject to the limitations thereby imposed, the survey gives some indication of the general level of wastage and disease incidence in dairy cows in the area covered.

It is proposed to publish at a later date the further information collected from October 1st, 1952, onwards. This will cover a wider area and will be based mainly on random samples changed annually. It will also embody the results of the experience gained during the first two years whereby the disposal categories and disease groups have been standardised and the data made more amenable to statistical analysis by the use of Cope-Chat cards and greater uniformity of recording technique.

Surrey, Berkshire and Wiltshire, 1950-52

Basic Data

The numbers of herds which supplied information, with their designations and the average numbers of cows on which the incidences are based, are given in Table I.

TABLE I

County	1950–51 No. of herds	1950–51 No. of cows	1951–52 No. of herds	1951–52 No. of cows
Surrey	Attd. &/or T.T. 32 Acc. & N.D. 26		Attd. &/or T.T. 31 Acc. & N.D. 24	
	Total ... 58	1,482	Total ... 55	1,406
Berks	Attd. &/or T.T. 43 Acc. & N.D. 21		Attd. &/or T.T. 46 Acc. & N.D. 12	
	Total ... 64	1,970	Total ... 58	1,881
Wilts	Nil		Attd. &/or T.T. 33 Acc. & N.D. 17	
			Total ... 50	1,679
Totals	Attd. &/or T.T. 75 Acc. & N.D. 47		Attd. &/or T.T.110 Acc. & N.D. 53	
	Total ...122	3,452	Total ... 163	4,966

Note.—51 of the Surrey herds kept records for both years ; 7 herds discontinued after the first year and 4 new herds were recruited. 57 of the Berkshire herds kept records for both years ; 7 herds discontinued after the first year and 1 new herd was recruited.

The size distribution of the herds is shown in Table II.

TABLE II

Size. No. of cows	1950–51 Surrey	Berks	Total	1951–52 Surrey	Berks	Wilts	Total
Up to 10	6	4	10	2	5	—	7
11–20	18	16	34	20	10	18	48
21–30	15	16	31	16	16	9	41
31–40	10	8	18	9	8	10	27
41–50	7	12	19	6	7	3	16
51–60	1	6	7	1	10	2	13
61–70	1	2	3	1	1	3	5
71–80	—	—	—	—	1	1	2
81–90	—	—	—	—	—	4	4
Total herds	58	64	122	55	58	50	163
Mean herd size	25·6	30·8	28·3	25·6	32·4	33·6	30·5

The age-distribution of the cows in all herds is shown in Table III. There is only slight variation between the distribution of age-classes in the different county samples and in the two years. This information was obtained by recording the numbers of animals in each lactation at one of the mid-year visits.

TABLE III

PERCENTAGE OF TOTAL NUMBER OF COWS IN EACH LACTATION

Lactation	1st	2nd	3rd	4th	5th	6th	Older
1950–51	27·3	22·5	16·4	11·4	8·2	5·6	8·6
1951–52	29·1	21·4	16·6	12·0	7·4	5·8	7·7

Deaths and Disposals

These have been recorded in six categories. The first five represent wastage of dairy cows in that they comprise animals which died, went to knackeries, to the Ministry of Food or to markets mostly for destinations outside the dairy industry. Category six contains animals disposed of in the ordinary course of business to sales, markets or other dairy herds and not classifiable as wastage.

Table IV shows the total number of cows in the herds surveyed for each county and year, and the disposals are given as percentages of the total number of cows under each category.

TABLE IV

	DEATHS AND DISPOSALS 1950-51 Surrey	Berks	Totals	1951-52 Surrey	Berks	Wilts	Totals
Total cows	1,482	1,970	3,452	1,406	1,881	1,679	4,966
	Percentages of total cows						
I. Deaths	1·5	1·5	1·5	1·2	1·2	1·3	1·3
II. Aged	1·2	1·9	1·6	2·7	2·6	2·4	2·6
III. Infertile	5·0	3·9	4·4	3·3	4·3	4·7	4·1
IV. Poor yield	3·6	5·0	4·4	3·9	5·8	5·1	5·0
V. Disease and accident	9·0	7·3	8·0	7·0	4·6	5·1	5·4
Total Wastage	20·3	19·6	19·9	18·1	18·5	18·6	18·4
VI. Surplus	8·6	6·0	7·1	5·9	4·2	2·1	4·0
Total deaths and disposals	28·9	25·6	27·0	24·0	22·7	20·7	22·4

The overall figures for both years and all herds are given in the next table.

TABLE V

DEATHS AND DISPOSALS FOR ALL HERDS, 1950-52

Category	Percentage of Total cows	Percentage of Total deaths and disposals
I. Deaths	1·4	5·6
II. Aged	2·1	8·9
III. Infertile	4·3	17·5
IV. Poor yield	4·8	19·6
V. Disease and accident	6·5	26·8
Wastage	19·1	78·4
VI. Surplus	5·2	21·6
Total deaths and disposals	24·3	100·0

Deaths

These were all "deaths on the farm" and do not include animals slaughtered on account of disease or accident. Of a total of 114 cows which died during the two years, representing 1.4 per cent. of the cow stock per annum or 5.6 per cent. of total disposals, 42 cows, or 37 per cent. were associated with parturition such as deaths following difficult calving,

toxaemia or septicaemia resulting from endometritis, prolapsed uterus, milk fever, etc. Thirteen per cent. of deaths were due to bloat and 10 per cent. to accidents and injuries. The remaining 46 deaths (40 per cent.) from all other causes were small numbers, or single cases, of various conditions including traumatic gastritis or pericarditis, magnesium deficiency (grass tetany), pneumonia, summer mastitis, acetonaemia, acute tuberculosis, yew poisoning, anthrax and blackleg.

Aged, infertile and poor yield

These categories tend to overlap as many animals are culled for more than one reason. When good prices are obtainable for butchers' carcases, there is a natural tendency to dispose of beasts from dairy herds if they are not in-calf after one or two services, if their yields are somewhat below herd averages, or if their maximum economic value as dairy cows is passed. These considerations adequately explain the differences between the figures recorded under these categories. It is often a matter of personal judgment on the part of the farmer or recorder to which category a given animal is allotted.

Taken together these three categories contain 10.4 and 11.7 per cent. respectively of the total, or an overall 46 per cent. of total disposals.

Disease and accident

Further details for this category are given in Table VI.

TABLE VI

PERCENTAGES OF TOTAL COWS DISPOSED OF ON ACCOUNT OF DISEASE AND ACCIDENT

	1950–51			1951–52			
	Surrey	Berks	Mean	Surrey	Berks	Wilts	Mean
Reactors	5·0	4·0	4·5	2·7	1·0	1·5	1·6
Johne's disease	1·4	0·8	1·0	1·3	0·6	0·6	0·8
Other sickness and accidents	2·6	2·5	2·5	3·0	3·0	3·0	3·0
Totals ...	9·0	7·3	8·0	7·0	4·6	5·1	5·4

In the Surrey and Berkshire herds during 1950-51 no fewer than 142 cows reacting to the tuberculin test were removed from 21 of the accredited and non-designated herds in progress towards attestation. These animals were included in the total of disease disposals. Only about half this number in Surrey and a quarter in Berkshire were similarly disposed of in the following year.

Recorded cases of Johne's disease, both confirmed and suspected, were all disposed of and are included in the above figures. The incidence was highest in the Surrey herds. The overall figure for both years is 0.9 per cent. of the total number of cows, or 3.7 per cent. of total disposals.

The incidence of disposals on account of other sickness and accidents remained fairly constant during the two years at 2.5 to 3.0 per cent. of the total. Included were animals slaughtered on account of chronic mastitis, injuries at calving or following abortion, poor condition, chronic lameness, traumatic gastritis or pericarditis, and accidents.

The total wastage in the first five categories was fairly uniform at about 18 to 20 per cent. of the total cow stock.

Surplus disposals

This is a variable category depending largely on what might be defined as farm policy. A number of herds regularly dispose of surplus cows and freshly calved heifers in the ordinary course of business and this appears to be more common practice in Surrey and Berkshire (for example in certain Channel Islands herds), than in Wiltshire where there is a greater proportion of commercial dairy herds.

Total deaths and disposals ranged between 20 and 30 per cent. It was greatest in Surrey and least in Wiltshire depending on the numbers of surplus disposals. In this connection it is of interest to note the proportion of first lactation heifers in Table III (27 to 29 per cent.) which is the main source of replacement.

Total sickness

The incidence of total sickness is summarised in Table VII. The incidences are *case* incidences, each attack of disease suffered by a given animal during the survey year being regarded as a separate case. The average number of cases of disease per 100 affected animals was 118.

The incidences for conditions associated with parturition are based on the total calvings, and for other diseases on the total cow stock.

Cases of disease occurring in animals which subsequently died or were disposed of in the survey year are included.

Reaction to the tuberculin test *per se* has been omitted from total sickness.

TABLE VII

INCIDENCES PER CENT. OF TOTAL SICKNESS

	1950–51	1951–52
Conditions associated with parturition		
Total number of calvings	3,515	5,041
Difficult calvings	2·0	1·6
Stillbirths and abortions	6·8	7·1
Retained afterbirth	3·3	2·5
Milk fever	2·8	1·6
Other genital disease	0·2	0·9
Total associated with parturition ...	15·1	13·7
Other disease conditions		
Total cow stock	3,452	4,966
Mastitis (including summer mastitis)	8·1	7·1
Digestive disturbances including winter scours	5·0	2·2
Foul foot	3·7	1·4
Accidents and injuries	3·2	2·0
Respiratory affections including husk	0·6	2·8
Johne's disease (all disposed of) ...	1·0	0·8
Acetonaemia	0·8	0·7
Bloat	0·6	0·7
Grass tetany	0·1	0·5
Clinical tuberculosis (all disposed of)	0·3	0·2
Other sickness	1·4	1·2
Total of other disease conditions ...	24·8	19·6
Total sickness	39·9	33·3

The remainder of this article consists of an analysis of the disease conditions in Table VII.

Difficult calvings

The incidences of the condition for each county and year are given in Table VIII.

TABLE VIII

	1950–51			1951–52			
	Surrey	Berks	Total	Surrey	Berks	Wilts	Total
Total calvings	1,569	1,946	3,515	1,448	1,839	1,754	5,041
Cases recorded	29	42	71	30	28	21	79
Incidence	1·9	2·2	2·0	2·1	1·5	1·2	1·6

In each year more than half the cases were at first parturition, 50.7 per cent. in 1951-52, and 50.6 per cent. in the following year. The incidence appears to decline rapidly in older animals.

Stillbirths and abortions

Approximately one pregnancy in 14 terminated in a foetus or calf born dead. The figures for the two years (1950-51 and 1951-52) were 6.8 and 7.1 per cent. respectively of total pregnancies. These figures only include recorded cases and take no account of unobserved early abortions. There is no doubt that a proportion of animals that return to service have aborted. In a few cases abortions are observed and recorded, but in many others they are only suspected or remain undetected.

Previously published figures for the incidence of stillbirths and abortions have usually been based on information supplied by farmers and stockmen, and there have been no precise definitions of the terms "abortion," "stillbirth" and "premature birth." Lovell & Hill (1940) gave the incidence of abortion for England and Wales as 5.5 per cent. and of stillbirths as 4.7 per cent. of total pregnancies during the years 1936 and 1937. This was prior to the introduction of S.19 vaccination. Withers (1952) reported incidences of 1.2 per cent. for abortions and 5.3 per cent. for stillbirths, during the years 1946-48, defining the former as terminations of pregnancy up to seven months gestation unless positive for *B. abortus* or other infective agent.

In the present survey gestation periods have been recorded in all cases but it was not possible to examine material bacteriologically. According to whether abortions are defined as terminations of pregnancy up to seven, eight or nine months from the date of service or insemination, and stillbirths as the balance of "deadbirths," the following table shows the incidences for the two years under review.

It is probably reasonable to assume that, on the average, pregnancies terminated up to eight months from the date of service or insemination have been recorded in the past by farmers and stockmen as "abortions" and later terminations of pregnancy as stillbirths or premature stillbirths. On this assumption the incidence of abortion would appear to have been reduced from 5.5 per cent. prior to the introduction of S.19 vaccine to about 2½ per cent. at the present time. It is known from collateral data that few of these are due to brucella.

TABLE IX
PERCENTAGES OF TOTAL PREGNANCIES

	1950–51		1951–52	
Terminated up to seven months	1·5	6·8	1·7	7·1
„ at over seven months	5·3		5·4	
Terminated up to eight months	2·4	6·8	2·6	7·1
„ at over eight months	4·4		4·5	
Terminated up to nine months	3·2	6·8	3·0	7·1
„ at over nine months	3·6		4·1	

Retained afterbirth

The age incidence of this condition based on the numbers of animals at each parturition is shown in the following table.

TABLE X
PERCENTAGE INCIDENCE OF RETAINED AFTERBIRTH AT EACH PARTURITION

	1950–51		1951–52	
At 1st calving	2·6	2·7	1·4	1·2
„ 2nd „	2·8		0·9	
„ 3rd „	3·7	3·6	2·4	2·9
„ 4th „	3·6		3·5	
„ 5th „	3·9	4·2	4·6	4·1
„ 6th „	4·6		3·5	
Older and not known ...	4·7		6·5	
Over-all incidence ...	3·3		2·5	

There are differences between the two years but the incidence undoubtedly appears to increase with age.

Milk Fever

In the samples of herds surveyed there was less milk fever in 1951-52 than in the previous year. In 1950-51 a little fewer than half the herds recorded cases, and in the following year only a little over a quarter of the herds recorded them. The respective incidences were 2.8 and 1.6 per hundred calvings.

The age incidence of milk fever based on the number of cases at each calving, and the total numbers in each lactation, show a striking increase with age.

TABLE XI
MILK FEVER : PERCENTAGE INCIDENCES FOR ANIMALS OF INCREASING AGE

	1950–51	1951–52	1950–52
At 1st calving	Nil	0·07	0·04
„ 2nd „	0·4	Nil	0·16
„ 3rd „	1·6	0·5	0·9
„ 4th „	6·1	2·0	3·6
„ 5th „	7·4	4·1	5·5
„ 6th „	6·1	5·9	6·0
Older and not known ...	10·1	7·9	8·8
Over-all incidence per 100 calvings	2·8	1·6	2·1

Note.—There was one case at first calving in 1951–52. This is illustrated graphically in Fig. 1 *(overleaf)*.

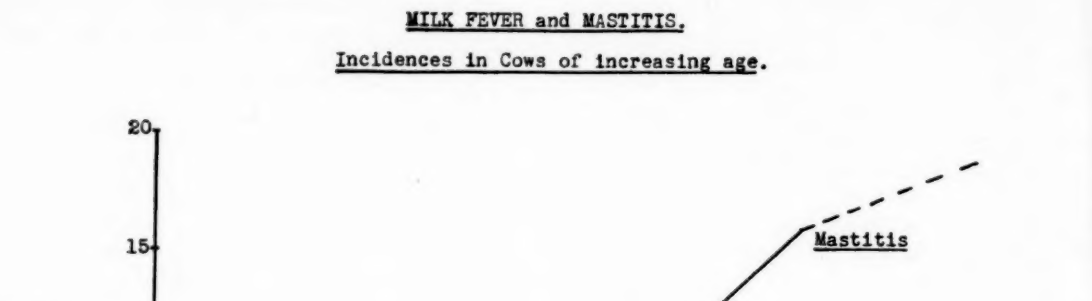

FIG. 1.

Mastitis

There were 280 and 353 cases of clinical mastitis recorded in the two years 1950-51 and 1951-52 respectively. These figures include seven and 26 cases respectively described as " summer mastitis " in dry cows. As these cases are so few they have been included in the general analysis.

The case incidence in the different county samples and in the two years is given in Table XII.

TABLE XII

Year	Herd sample	Number of herds	Total cows	Mastitis incidence percentage
1950–51	Surrey	58	1,482	7·9
	Berkshire	64	1,970	8·3
1951–52	Surrey	55	1,406	7·1
	Berkshire	58	1,881	6·1
	Wiltshire	50	1,679	8·2

Table XIII shows further general information on the disease in the two years under review.

Age incidence.—The incidence of mastitis rises very sharply with age. This is illustrated in Table XIV where the successive incidences are based on the numbers of cows in each lactation.

TABLE XIII

	1950–51	1951–52
Total number of herds surveyed	122	163
Total cow stock	3,452	4,966
Number of cases of mastitis ...	280	353
Case incidence per cent. ...	8·1	7·1
Number of cows affected ...	244	319
Individual incidence per cent. ...	7·1	6·4
Cases per affected animal ...	1·26	1·11
Number of herds with cases of mastitis	72 (59%)	98 (60%)
Cow stock of affected herds ...	2,300 (67%)	3,378 (68%)

TABLE XIV

	Incidence per cent.		
	1950–51	1951–52	1950–52
First lactation ...	2·7	2·6	2·6
2nd " ...	4·1	3·8	3·9
3rd " ...	6·9	5·9	6·3
4th " ...	7·1	11·1	9·5
5th " ...	12·0	10·6	11·2
6th " ...	14·9	16·4	15·8
Older " ...	18·9	18·6	18·7

This is illustrated graphically in Fig. 1 for comparison with the corresponding increase in the incidence of milk fever.

Stage of lactation.—Approximately one third of the total cases of mastitis seem to occur within the first month and a majority of these within a few days to a week of calving. The incidence then falls off gradually and here is a rise in the proportion of cases towards the end of lactation. This is illustrated in Table XV.

TABLE XV

Stage of lactation	Percentage of total cases	
	1950–51	1951–52
Within one month of calving ...	31·4	33·1
During the 2nd month	10·0	12·7
„ 3rd „	10·0	9·0
„ 4th „	8·2	8·2
„ 5th „	5·0	4·8
„ 6th „	6·8	5·0
„ 7th „	4·3	5·7
„ 8th „	2·1	3·4
„ 9th „	3·6	2·6
„ 10th „	4·3	3·1
When drying off or dry	11·1	10·2
Not known	3·2	2·2
Total	100·0	100·0

Numbers of quarters affected.—In the majority of cases only one quarter was affected at each attack. Details were recorded in 89 per cent. of the cases. In 68 per cent. only one quarter was affected. Thirteen per cent. recorded two affected quarters, 2 per cent. three quarters and 6 per cent. all four quarters. This information was not available for 11 per cent. of the total cases.

Seasonal incidence.—In the samples of herds surveyed during the two years under review there is only very slight evidence of any seasonal influence. This question will be further examined when more data are available.

Effect of herd size.—Table XIII gives some indication of the tendency to a greater incidence of mastitis in the larger herds. Sixty per cent. of the herds recorded cases, and these contained over 67 per cent. of the total number of cows. In 1951-52 there is an apparently significant difference between the herds in Surrey and those in the other two counties in this respect. In Surrey nearly half the herds, containing practically half the total number of cows recorded cases of mastitis, and the sizes of affected and unaffected herds are almost identical. In Berkshire and Wiltshire nearly two-thirds of the herds, containing three-quarters of the total had cases, and the mean sizes of affected and unaffected herds were approximately 38 and 24 cows respectively. This is illustrated in Table XVI.

TABLE XVI

	Surrey	Berks	Wilts
Number of herds with cases of mastitis	27	38	33
Percentage of total herds surveyed	49·1	65·5	66·0
Cow stock of these herds ...	697	1,438	1,243
Percentage of total cows	49·6	76·4	74·0
Mean sizes of affected herds ...	25·8	37·8	37·7
Mean sizes of herds free of mastitis	25·3	22·2	25·6
Mean sizes of all herds surveyed...	25·6	32·4	33·6

During the Weybridge Mastitis Survey the Surrey herds were subjected to "blitz" treatment. Cases of clinical mastitis seem to have reappeared, irrespective of herd size, in those herds which, once clear, discontinued regular sampling.

The Berkshire and Wiltshire herds were not subject to such treatment. There is a larger proportion of affected herds and a higher incidence of mastitis in the larger herds.

Digestive disturbances including "Winter Scours"

The difference in incidence in the two years is accounted for by the prevalence of winter scours in 1950-51 when there were 84 cases of this ailment in five herds accounting for nearly half the sickness under this heading.

Other conditions included were indigestion, digestive chill and traumatic gastritis.

Foul Foot

The variation between the two years is mainly accounted for by the high incidence in one herd in 1950-51 in which 60 of the total of 109 cases occurred. The number of cases did not exceed five in any other herd in this year or seven in any herd in 1951-52.

Accidents and Injuries

There was a lower incidence under this heading in 1951-52 compared with the previous year from 3.2 to 2.0 per cent. Nearly half the recorded cases were due to injuries to the udder and teats caused by barbed wire and by "horning."

Respiratory affections including husk

The increasing incidence in 1951-52 is due to the greater prevalence of husk in adult cattle. Only 16 cases of husk were recorded in 1950-51 compared with 101 in the following year. These represented 70 per cent. of the respiratory disease and occurred in six herds.

Johne's Disease

All animals recorded as suffering from Johne's disease were slaughtered. There was a slightly lower overall incidence in 1951-52 compared with the previous year. Only 24 herds in each year out of a total of 122 in 1950-51 and 163 in 1951-52 recorded cases. The incidence was highest in the Surrey herds. Both confirmed and suspected cases are included. There is a possibility that some cases of this disease may be concealed by recording disposals under other categories. In this connection further data from a wider area will be of interest.

Acetonaemia, Bloat and Grass Tetany

The following table gives the numbers of herds with cases of these conditions, and the incidences for all herds.

TABLE XVII

	1950–51 Total herds 122		1951–52 Total herds 163	
	Herds with cases	Incidence	Herds with cases	Incidence
Acetonaemia ...	18	0·8	20	0·7
Bloat	11	0·6	22	0·7
Grass tetany ...	4	0·1	16	0·5

The incidence of grass tetany (hypomagnesaemia) increased very considerably in 1951-52, but the difficulty of identifying with certainty cases of this disease in a survey of this kind must be taken into account.

The numbers of cases of these conditions are very small and much more information is necessary before any useful analyses can be made.

Clinical Tuberculosis

There were 12 cases in 1950-51 and eight in the following year, incidences of 0.3 and 0.2 per cent. respectively. All were disposed of to knackeries.

Other sickness

The incidences of miscellaneous sickness were 1.4 and 1.2 per cent. in the two years respectively. Conditions included were poisoning (yew and ragwort), wooden tongue, pyelonephritis, parasitic disease (other than husk), urticaria, cowpox, eye infections, etc.

Total Sickness

There was less total sickness in 1951-52 compared with the previous year, the incidence being reduced from 39.9 to 33.3 per cent. This is not accounted for by the addition of the Wiltshire herds in the second year.

In Table XVIII the incidences of total sickness are given to the nearest integer for the county samples of herds in the two years.

TABLE XVIII

	Percentage incidences of total sickness			
	Surrey	Berks	Wilts	Mean
1950–51 ...	44	37	—	40
1951–52 ...	39	28	35	33

The lower incidences in the Surrey and Berkshire samples are quite marked. They are accounted for chiefly by lower incidences of winter scours and foul foot and, to a smaller extent, by conditions associated with parturition and mastitis, accidents and injuries. The increased incidence of husk in 1951-52 only accounts for about one quarter of the difference due to the conditions mentioned above.

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DUBLIN GRADUATES REUNION DINNER

Arrangements have been made for a Dublin Graduates Reunion Dinner to be held in Thompson's Restaurant on Tuesday, September 6th, at 6 p.m. Tickets will be 14s. per head.

As it is extremely difficult to anticipate the number of graduates and friends wishing to attend this function, it would be appreciated if those interested would make application for their tickets (enclosing subscriptions) *before* Saturday, August 27th, so that final reservations and financial arrangements may be completed in good time. Applications should be addressed to:—Mr. J. C. G. McCrea, Hon. Sec. Organising Committee, County Chambers, Market Street, Omagh, Co. Tyrone, Northern Ireland.

Controlled Trial of a Proprietary Husk Remedy

BY

E. L. TAYLOR and J. F. MICHEL

Ministry of Agriculture Veterinary Laboratory, Weybridge

WHERE so little is known and the need for an effective treatment is so great it is reasonable to leave no stone unturned. Striking claims having been made for a certain remedy for parasitic bronchitis, sold under the trade name " Strongylin," we arranged a small trial, in order that any benefit that might be derived should be clearly demonstrated and clinicians be informed on the extent of anthelmintic action.

Eight calves were used for this purpose, 4,000 larvae of *Dictyocaulus viviparus* being administered to each. By the 23rd day following infection all were showing symptoms of husk, and one died on that day.

Four of the remaining seven calves were picked at random and 30 c.c. of " Strongylin " (the recommended dose) was administered to each. The material proved to be a viscous green liquid with a smell reminiscent of phenol. It was given orally in half a pint of tap water. At the same time the other three calves were each given half a pint of water from the same source. Dosing with " Strongylin " and the administration of water to the control animals was repeated on the 26th day after infection.

A calf belonging to the dosed group died on the 28th day and all the other calves were slaughtered on the 29th day. The numbers of worms recovered from the lungs are shown in the table.

Calf number		Worms recovered	Day killed or died
3435	Control	2,786	D 23rd day
3426	Control	157	K 29th day
3436	Control	263	K 29th day
3440	Control	102	K 29th day
3438	Treated with " Strongylin " 23rd and 26th day	2,158	D 28th day
3437	Treated with " Strongylin " 23rd and 26th day	199	K 29th day
3441	Treated with " Strongylin " 23rd and 26th day	610	K 29th day
3442	Treated with " Strongylin " 23rd and 26th day	201	K 29th day

If the calf which died before any dosing had been done is included in the undosed group then the mean of the numbers of worms from the undosed calves is 827, while that from the dosed calves is 792. It will be seen that this small difference is entirely due to the greater number of worms in the calf (No. 3435) which died before the division into dosed and undosed groups.

In our experience of the assay of anthelmintic action the kind of laboratory trial above described is the most reliable. The use of naturally infected animals on farms is less satisfactory because of a number of variables that come into operation, not only with regard to the extent of infestation but also with regard to the point of time at which the infestation took place and the approximation to the time at which the individual animals will throw off their infection as the

(*Concluded at foot of col.* 1, *page* 613)

FIG. 1.—Section through Senkobo lesion. Note scab formed of several layers. × 50.

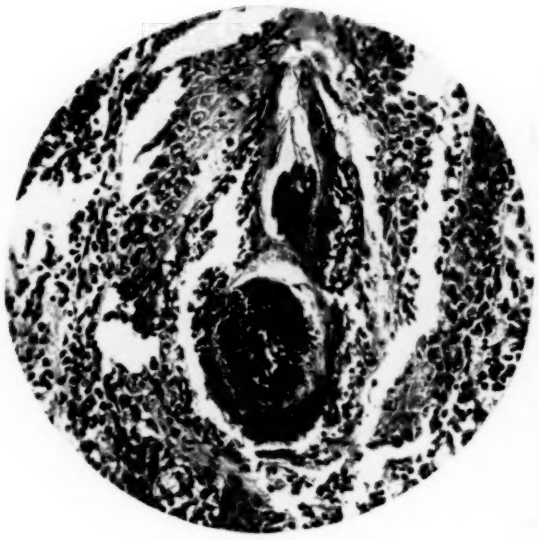

FIG. 2.—Section through Senkobo lesion. Note penetration of mycelium into hair follicle. × 200.

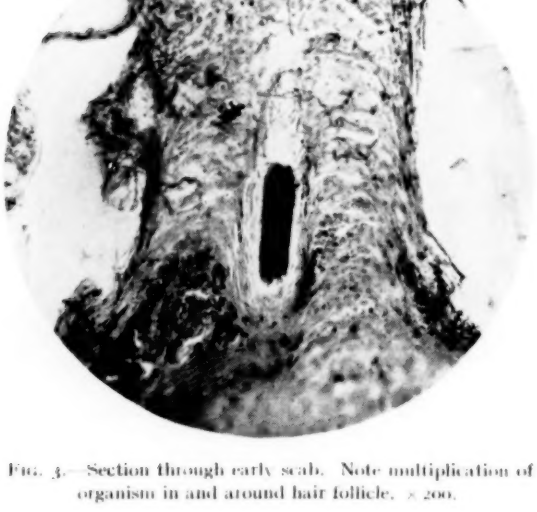

FIG. 3.—Section through early scab. Note multiplication of organism in and around hair follicle. × 200.

Cutaneous Streptothricosis in Cattle

BY

I. ZLOTNIK

Veterinary Research Laboratory, Blantyre, Nyasaland

Introduction

CUTANEOUS streptothricosis or Senkobo skin disease is a clinical entity which has been known for nearly half a century in various countries of tropical Africa. However, it appears that this disease did not exist, or has not been diagnosed in Nyasaland until very recently.

There exist many records of the disease but the most accurate account is that given by Hudson (1936–7), who isolated the causative organism and called it *Actinomyces congolensis*.

In the present paper a description is given of the disease in Nyasaland and a report on a successful method of treatment together with a detailed histological study of the skin lesions.

Clinical Picture

According to Hudson (1936–7), in Kenya the disease naturally affects cattle, sheep, goats and horses. Curasson & Mornet (1941) also observed the disease in domestic ruminants only, throughout French Tropical Africa. In Nyasaland, apart from a few sporadic cases, the disease has affected two herds of cattle only. One a grade Friesian herd and the other an African Zebu herd. No cases have been observed in animals other than bovines.

The early symptoms of Senkobo usually appear at the beginning of the rainy season. The onset is very insidious and slow, and the lesions are usually localised along the back of the animal, spreading slowly along the loins and rump down the thighs. The first lesions are very small, the largest being the size of a threepenny piece. The lesions consist of a slightly raised area on which the hairs are standing erect and matted together in the form of a bundle. The matted hairs can easily be detached leaving a moist area on the skin which soon becomes covered by a crust. As the disease progresses the crusts, which initially are very thin, become thicker, larger and harder. Finally, when a larger area of skin is thus affected with several lesions it resembles the skin of a crocodile.

The disease is most frequently chronic in character. In many instances, however, it may become more acute, in which case new crops of lesions appear in quick succession spreading along the whole body of the animal. When masses of crusts are situated on the legs, especially the hind legs, they often cause cracking of the skin over the joints. Secondary inflammation often ensues and one of the most serious complications is the swollen-leg form where a widespread cellulitis involves one or more legs. This form is usually accompanied by a general systemic reaction. In the writer's experience no recovery has ever taken place once the swollen leg form has been contracted, animals dying after variable periods.

In milder cases the localised lesions seem wholly or partly to subside towards the end of the rainy season and flare up again with the beginning of the new rains. More generalised cases do not improve to any great extent in the dry season and are affected with the disease throughout the whole year.

Epidemiology

There seems to be a consensus of opinions that the Variegated Bont tick (*Amblyoma hebreum variegatum*) is the vector of Senkobo (Shaw, 1952, & Curasson, 1941), but this belief appears to be based on the assumption that this disease appears during the season that the Bont tick is most active. The observations in Nyasaland do not lend any support to the above theory. In our experience the following points are of interest and very suggestive of the way the disease is spread.

In both the estates affected with Senkobo the adult cattle have been grazing on fields well covered with bushes and trees. The animals while sheltering or walking under the trees have very often been scratched by the low branches and have afterwards exhibited along their backs lines with raised hairs. When the first Senkobo lesions appeared they were situated along these scratches on the backs or loins. This fact would suggest one of two things: either the pathogenic organisms are saprophites on the coats of the animals and can exert their influence after scarification of the skin by the branches, or the pathogens are saprophites on the branches and when these scratch the skins of the animals the pathogens are introduced intradermally. It is worth noting that in the case of one of the estates, since the original outbreak occurred calves and heifers were kept on a paddock devoid of any trees or bushes and none of these animals have ever contracted the disease.

A second point of interest is the fact that on both estates the herds were affected with demodectic mange at the same time as with Senkobo. Whether this is just a coincidence or whether demodex parasites play some part in the spread of Senkobo is difficult to ascertain.

Finally, experience in this country has indicated that when animals were dipped in arsenious solutions the spread of Senkobo has been checked. In both estates affected with Senkobo it has been routine to spray the animals with BHC or DDT, but since the outbreak of Senkobo they have reverted to arsenic. This would seem to indicate that the influence of the insecticide on the disease has not been through the tick population,

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outcome of an acquired resistance. Although the number of animals in this trial was only small the indications to be derived from the results are considered to be reliable and it is worthy of notice that we failed to find any evidence of anthelmintic action in the remedy called "Strongylin."

but on the actual pathogen. It is known that arsenic is bacteriocidal while BHC and DDT are not, and it would appear therefore that dipping in arsenic solution causes the destruction of the organisms present on the coat.

Diagnosis

Diagnosis can be based on the clinical picture, but must be confirmed by microscopical examination of smears from untreated lesions. The smears are made from the moist area left after hand removal of a scab. The finding is that of epidermal cells, lymphocytes and mycelia consisting of branching filaments which are composed of rows of gram-positive coccoid forms. Histological examination of skin lesions will also lead to a correct diagnosis.

Histopathology

The pathological process begins with the penetration of mycelia of *Actinomyces congolensis* into the hair follicle. The organism multiplies within the hair follicle in the external root sheath and the hair papilla, leaving the actual hair shaft intact. The body reaction to this mycelial invasion is an accumulation of round lymphoid cells around the hair follicle and penetration into the hair papilla. Very soon the lymphocytes infiltrate the surrounding tissue and stimulate a proliferation of the Malpighian layer, all around the hair follicle (Figs. 1 and 2). Later the lymphocytes surrounding an infected follicle begin to undergo necrobiosis and disintegrate, while the superficial Malpighian layers become hornified. At this time the mycelium breaks out of the hair follicle and infiltrates the cornified superficial skin layer. This part of the epidermis is soon cast off and separates from the skin in the form of a scab (Fig. 3). Underneath the scab, as long as new hair follicles are invaded by mycelia, the proliferation of the Malpighian layer and hornification is continuously going on. New layers of scabs are being added to the first scab, thus causing a gradual increase in the size of the scab. Irrespective of the size of the scab or crust, provided no secondary bacterial infection has taken place, there is underneath an uninterrupted layer of living epidermal cells. It is worth noting that the organism multiplies in the hair follicles, in the moist area of skin underneath the scab and in the partly hornified crust only, and at no time does the mycelium penetrate below the epidermis. In this respect the present observations are in complete agreement with those of Hudson.

In long-standing lesions the lymphocytic infiltrations may be very considerable and they may penetrate into the dermis and also hypodermis, where they accumulate around the capillaries, small arteries and veins.

Healing of uncomplicated skin lesions takes place without any scar formation. In many instances, however, secondary bacterial infection supervenes in the original process, leading to polymorphonuclear cell infiltration, destruction of the Malpighian layer and suppuration. Whenever secondary infection sets in, healing of the lesions is always accompanied by scar formation.

Treatment

Malfroy (1938) claims that in the early stages of Senkobo the following formula gave beneficial results: picric acid 3 g., copper sulphate 3 g., water 1,000 g. He stresses, however, the fact that in certain animals, although treated systematically with this formula, the disease continued to progress and the animals had finally to be removed from the herd.

According to Curasson & Mornet (1941) arsenical dips have a definite preventive action on the disease. In the early stages of Senkobo they recommended Malfroy's formula, but when the scabs become firm and hard, they suggest extirpation and cauterisation of the lesions. In the opinion of these writers, if the lesions become widespread there is no hope for the animal, and it is advisable to destroy it.

In Nyasaland attempts to control the disease have been made with a whole series of treatments such as a mixture of sump oil and 2½ per cent. formaldehyde; pot. iodide 1 : 400; and lime and sulphur washes. In no case, however, has a cure been obtained from these treatments. Recently, on the suggestion of Dr. H. S. Purchase, of Messrs. Cooper & Nephews S.Af. (Pty), Ltd., a quaternary ammonium compound, called "Anabac," described as a dairy sanitiser, has been tried out in the treatment of the disease. The results of these trials have been excellent. Experience showed that daily applications of Anabac, in a dilution of 1 : 100, to the diseased parts of the skin only, can cure recently contracted cases within two weeks. In long-standing cases it is necessary after the first two weeks to continue applications every fifth day until complete recovery is obtained. It is very important that "Anabac" should be applied only by means of a swab to the actual lesions, the healthy skin being protected if possible with vaseline. Liberal applications of Anabac to healthy skin may cause burning.

Summary

1. The clinical picture of Senkobo in cattle is described.

2. Experience in Nyasaland points to the great part played by tree thorns and branches in the mechanical transmission of the disease.

3. A description of the histology of the skin lesions is given.

4. "Anabac" can be considered an effective drug in the treatment of Senkobo.

Acknowledgments.—I wish to thank Mr. D. E. Faulkner, the Director of Veterinary Services, Nyasaland, for his permission to publish this paper and for reading the manuscript. I should like to record my grateful acknowledgment of the advice given me by the Technical Department of Messrs. Cooper & Nephews S.Af. (Pty.), Ltd., and for providing me with "Anabac" for trials in Nyasaland. Thanks are due to Mr. Z. Wolak, Livestock Officer, for carrying out the treatment with "Anabac" in the infected herds.

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Uterine Infection and Congenital Johne's Disease in Cattle

BY

J. K. L. PEARSON

Veterinary Research Division, The Farm, Stormont, Belfast,

WITH

T. G. McCLELLAND

THE practice of removing the newly born calf from its dam at birth has been advised for many years as a precaution against Johne's infection. The calf is prevented from suckling the udder and every effort is made to prevent faecal contamination of the new-born animal.

Until 1950, Johne's disease in Northern Ireland was rarely seen (Pearson, 1953); but in the four years following nearly 80 clinical cases have been confirmed and an opportunity presented to study some of the herd conditions in relation to the disease.

During these years a strong suspicion of original congenital infection was indicated in several cases, but at the clinical stage no proof could be obtained owing to the possible loophole of a post-natal infection.

Consequently, in December, 1954, two cattle showing blood-positive reactions to the Johne's complement fixation test were slaughtered three weeks prior to calving. Their foetuses were then subjected to an intensive cultural examination for Johne's bacilli.

The uterine mucosa of each cow was also cultured and material taken for histological examination.

Cultural Methods

Uterus, bowel and lymph node materials were removed cleanly and separately, ground in sand, treated with oxalic acid in the usual way and seeded on to Taylor's modification (1950) of Finlayson's egg-yolk phlei medium. Williams Smith's (1953) solid modification of Dubos medium was also used and cultures examined at weekly intervals from the fourth week. Only organisms showing the cultural and morphological characters of Johne's bacilli are recorded.

In the interim a further clinical case of Johne's disease was notified with a history of one offspring being born dead, one being aborted and one dying with a scour of unknown identity. In this cow the uterus was thought to be abnormal and Johne's organisms were isolated in culture from the uterus mucous membrane.

A summary of the findings may be given as follows :—

Cow No. 49

Friesian cow, imported from Scotland on September 13th, 1951, as a maiden heifer.

Two normal calves born and a third calf due late in January, 1955. Complement fixation test positive on three occasions—October and December, 1954, and at time of slaughter. No clinical change until October, 1954—thence history of periodic scouring and gradual loss of condition. Faeces positive only during last three weeks.

January 5th, 1955, cow shot and eight months female foetus removed at *post mortem*. Lesions in dam's bowel and mesenteric lymph nodes typically affected and cultures positive. Uterus of dam apparently normal but cultures positive.

Calf Examination.—Ileo caecal lymph nodes larger than normal but no acid-fast bacilli seen microscopically. Johne's bacilli isolated from I.C.V. lymph nodes and from bowel mucous membrane.

Cow No. 23

Friesian cow with history of importation as in above case. Imported September 13th, 1951, and carrying third calf. Due to calve late in January, 1955. Complement fixation test positive October and December, 1954, but no history of scouring.

This cow was slaughtered at the same time as No. 49 and all laboratory examinations made concurrently.

Results in this case were completely *negative*; both calf and cow showing no gross lesions in bowel or lymph nodes and all cultures being negative at nine weeks.

The main interest in recording this case is that it acted as a good control on media and technique in examinations made in No. 49, its herd companion.

Cow No. 265

Shorthorn cow imported from England in October, 1951. First calf born March, 1952, but died of scour at age of nine months. Cause not known. Twin calves aborted at six months' gestation in February, 1953. Live calf born December 31st, 1953, and still with owner when 14 months old. Still-born calf born full term on December 30th, 1954.

Disease symptoms were not seen in the cow until two to three weeks before calving. Persistent scour developed and rapid emaciation. Slaughtered January 28th, 1955. *Post-mortem* examination for Johne's disease typical in bowel and mesenteric lymph nodes.

Typical acid-fast bacilli were seen in smears of the uterine mucous membrane and Johne's organisms were successfully isolated in culture at five and a half weeks. Only isolated bacilli were seen in histological sections but these were not associated with any pathological change in the uterine tissue.

The still-born calf was unfortunately buried but was exhumed for cultural work four weeks later. Mesenteric lymph nodes were in a good state of preservation but cultures from these were still negative at nine weeks.

Discussion

The significance of the congenital infection is obvious and presumably there are many such unsuspected infections transmitted in herds where Johne's disease is endemic.

If this is in fact true, other means of control must now be brought to bear in the control of Johne's disease. Taking the calf from the dam at birth may not be sufficient protection, and more particularly so if the dam becomes a clinical case soon afterwards. It may, of course, be found that a congenital infection will not occur unless a fulminating infection develops in the dam but there is no reason to believe that this should be the case. The congenital infection recorded here indicates that the organism passed the placental barrier without causing gross involvement of the uterine tissue.

The isolation of Johne's bacilli from the uterus is not previously recorded and gives rise to further speculation on the pathogenic rôle of the Johne's bacillus. In Cow 265 and Cow 49 the organism had established itself in the uterine mucosa without causing a characteristic reaction in the mucous membrane and submucosa.

Summary

A case of congenital infection of the foetus with *Mycobacterium johnei* is recorded, the organism being isolated from the ileo-caecal lymph nodes and bowel of the foetus. The organism was also isolated from the uterine mucosa of this animal.

A second case of infection of the bovine uterus with *M. johnei* is also recorded but the infection was not found to be associated with pathological changes in the uterine tissue in either cow.

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AN A.I. EXPERIMENT

Readers who may not have read a note published in the *Daily Telegraph* of August 9th, and in other newspapers, may be interested in the following paragraphs which are quoted from that journal:—

The Kennel Club has approved an experiment for the artificial insemination of a pedigree dog. The bitch is a Finnish spitz and the sire is in Finland. This is the first time that artificial insemination for dogs has been used internationally, although it has been used on a small scale in Britain.

Last year only 44 Finnish spitz were registered with the Kennel Club. It is one of a variety of similar breeds which include the elkhound and the samoyed.

Mr. Holland Buckley, secretary of the Kennel Club, said yesterday that the club insisted on being informed of any experiment of this kind. A veterinary certificate had to be supplied from both sides and the fact would be registered on the pedigree certificate.

Artificial insemination for dogs, he added, was technically a little more difficult than for cattle. Results in Britain had been rather mixed.

SHROPSHIRE FARM INSTITUTE

A £14,000 extension to the Shropshire Farm Institute at Walford, near Shrewsbury, has been completed. The building, which includes three lecture rooms, a demonstation laboratory, and a number of offices, will relieve pressure on Walford Manor, required as a hostel for students.

Current Literature

ABSTRACTS

The Intravaginal Inoculation of Guinea-Pigs as a Method of Demonstrating *Vibrio foetus* in the Semen of Infected Bulls. POWER, J. H. (1954). *Irish Vet. J.* **8.** 238–242.

The author describes a modification of the method devised by Adler (1953)* for the isolation of *Vibrio foetus* from the semen of infected bulls. The method was used successfully in the case of a bull from a herd in which positive mucus agglutination tests for *V. foetus* had been obtained. A note added to the end of the article states that the method had also been used successfully in a second case.

Two semen samples were collected from the bull using sterile apparatus, and were stored at 4° C. Six two-month-old female guinea-pigs, not obviously pregnant, were selected from stock and each received 1 mg. of stilboestrol diproprionate by the intramuscular route, on three occasions, to induce oestrus. 0·25 ml. of each of the two semen samples was inoculated into the vagina of each of the guinea-pigs on the same day as the third injection of stilboestrol. As the semen had been stored for 14 days before examination, in this case a second dose of pooled ejaculate was given on the following day.

The guinea-pigs were killed on the seventh or eighth day after the first dose of semen. The uterus was removed aseptically and cut into five portions; four of these portions were inoculated into peptone-blood-broth and the fifth was ground up in saline and inoculated on to an ox-blood agar plate. The cultures were incubated at 37° C. in 10 to 20 per cent. CO_2.

Two guinea-pigs were pregnant and neither of these gave *V. foetus* in culture. Of the other four animals, three yielded pure cultures of the organism.

(Abstractor's Note: Although not mentioned in the article the use of control guinea-pigs might be advised.)

M. B. H.

Reference

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The Isolation of Bacillus Anthracis from Bones. DAVIES, D. G., & HARVEY, R. W. S. (1955). *Lancet*, July 9th, 1955. 86–87.

The authors point out that there is little information about the frequency with which *Bacillus anthracis* can be isolated from bones and bone products.

In 1912 two workers isolated the organism from one out of four samples of bones supposed to have produced anthrax in dock labourers. In 1942 another worker reported 11 positives out of 14 samples of ground bone-meal which were incriminated in human and animal cases of the disease. In 1955 two other workers reported the presence of *B. anthracis* in three specimens of bone-meal associated with human anthrax cases. Animal inoculation was the method used in all these instances. The authors of the present paper described, in an earlier paper published in 1953, 14 cases of anthrax among workers in a chemical

factory. The raw material responsible was sun-dried bones from the Near and Middle East.

It was in view of these findings that the authors decided to investigate all cargoes of bones destined for the chemical factory over a period of 18 months. No attempt was made to select only those consignments whose processing was related to anthrax cases at the factory, though two such infections did occur during the period of investigation.

As animal inoculation appeared to be the most delicate method available it was the one chosen. One sample was obtained from each consignment consisting of 500 grammes of coarsely crushed but not powdered bones. The whole sample was ground and a suspension formed from an aliquot part with Ringer's solution. Guinea-pigs were injected subcutaneously with 2 ml. of the final suspension. The guinea-pigs had previously been passively immunised against infection with *Clostridium welchii*, *C. septique* and *C. oedematiens*.

In all, samples from 41 cargoes of bones were investigated. From these, five positive samples were obtained representing 12·2 per cent. infection rate. Of the positive shiploads four came from Pakistan and one from Syria.

The number of guinea-pigs inoculated from each specimen varied from two to nine according to the amount of material suitable for injection that was available after the grinding process was complete. The use of several guinea-pigs for each specimen showed that even within a small sample like 500 grammes the anthrax spores were distributed irregularly.

One sample inoculated into seven guines-pigs gave positive results in only one pig. One sample inoculated into four guinea-pigs, positive in two only. One sample inoculated into six guinea-pigs, positive in one only.

Out of a total of 183 guinea-pigs inoculated 14 died of intercurrent infections and therefore a few positive results may have been missed.

If anthrax spores are irregularly distributed through a small specimen of 500 grammes their distribution in a large cargo of bones is bound to be even more irregular and therefore the proportion of cargoes found to contain infected bones is probably a very considerable underestimate.

Cultural methods were tried but were found quite unsuitable for the material concerned.

Activity of Piperazine, *In Vitro*, Against *Ascaris Lumbricoides*. STANDEN, O. D. (1955). *Brit. med. J.* July 2nd, 1955. 20–22.

Piperazine hydrate and certain salts of piperazine have been shown to possess a high efficiency against *Ascaris lumbricoides* in man, but little work has been reported on the *in vitro* activity of piperazine against ascarides. Poynter (1955), using piperazine adipate *in vitro* against *Parascaris equorum*, showed that drug-affected worms recovered when they were placed in drug-free medium. The present series of experiments was carried out preparatory to trials with piperazine citrate against *A. lumbricoides* in man.

The worms used in the experiments were *A. lumbricoides* from the pig. The worms were obtained from the abattoir, where they were removed from the gut immediately after the pig was slaughtered. Three salts of piperazine—the citrate, the adipate and the phosphate—were tested to compare their activity, *in vitro*, against *A. lumbricoides*. All three salts of piperazine were equally efficient in inducing a state of narcosis in the worms. The drugs induce a state of narcosis in the worms, which recover in drug-free medium. The onset of narcosis was gradual and did not irritate the worms. It is considered a desirable feature that the drugs do not irritate the worms and stimulate violent movements of them. The rate of recovery of the worms in drug-free medium is much the same—namely, a half to two hours—for all three salts of piperazine tested.

Reference

POYNTER, D. (1955). *Vet. Rec.* **67**. 159-163.

Canicola Fever Simulating Poliomyelitis. RAMSAY, A. M. (1955). *Brit Med. J.* July 2nd, 1955. 24.

Four cases of human infection with *Leptospira canicola* were observed in North London during the period 1948-54, these cases presenting signs simulating poliomyelitis. The investigation included agglutination tests.

The author considers that the presence of mild conjunctivitis and nephritis accompanying symptoms of meningitis is suggestive of canicola fever.

Although chloramphenicol appeared to bring about a marked improvement in one case it is stated that there is no convincing evidence that any antibiotic is specific.

Canicola Fever with Neurological Complications. MIDDLETON, J. E. (1955). *Brit. med. J.*, July 2nd, 1955. 25–26.

A case of canicola fever in a human patient is described. Infection was contracted from a pet dog. Initial recovery was complete after treatment with chlortetracycline (aureomycin), but convalescence was complicated by severe radiculitis. The right serratus anterior and the right diaphragm were paralysed and there was transient paresis of the left thumb. Initial subjective sensory changes over the left forearm were also present.

Recovery was finally complete 18 months after the onset of the illness.

G. F. B.

SWINE FEVER IN ESSEX

Since the Swine Fever (Infected Districts) Order, 1955, was brought into force on May 13th the disease position in Essex has shown continuing improvement and the situation there is now under control. It was, therefore, decided to remove the restrictions imposed by the Order from Essex with effect from Friday, August 12th.

The position of the other counties (Cheshire, Lancashire (except the Furness Division), Shropshire, Stafford, Warwick and Worcester) which remain subject to restriction is being kept under review.

News and Comment

UNIVERSITY NEWS

Liverpool

Degree of B.V.Sc. Second Examination, Part III (Animal Management).

Alderson, Valerie A.; Ashcroft, R. A.; Beadle, G. G.; Bryan, N. M.; Cavendish, Maureen A.; Davidson, P. A. S.; Davies, A.; Davies, H. S.; Ducker, M. C.; Edwards, J.; Hamilton, J. G.; Haywood, R. H.; Hothersall, Maureen; Ingman, N. R.; Janes, P. D.; Lloyd, Anne S.; Lloyd, R.; Macarthur, G. J.; McFarland, A. G.; Malkinson, M. H.; Moody, Enid; Pearson, P. D.; Penhale, W. J.; Perry, K. T. E.; Pilling, T.; Robson, J.; Sulley, M. J.; Vivian, J. S.

THE ROYAL SANITARY INSTITUTE

The Council of the Royal Sanitary Institute announce that Her Majesty the Queen, Patron of the Institute, has been graciously pleased to command that the Institute be known henceforth as The Royal Society for the Promotion of Health.

The Institute was founded, in 1876, for the purpose of promoting the health of the people. At that time the meaning of "sanitary" was "pertaining to health." To-day it is virtually a misnomer as the word "sanitary" is, in common usage, misinterpreted and no longer associated with "health" in its true sense.

The title of the Institute is to-day descriptive of only a fraction of its many diverse activities, which include veterinary hygienes, food and nutrition. The Council have, therefore, given long and careful consideration to the title and have concluded that it would be desirable if the original meaning of "sanitary" were restored by translating it into "health," a term which already appears in the armorial bearings as *salus generis humani*.

The Council desire to emphasise that present Fellows, Members, Associates and Affiliates would, in accordance with customary procedure, retain the right to continue to use the present designations (F.R.San.I., M.R.San.I., A.R.San.I., Affil.R.San.I.), if they so wished, or to use the new designations (F.R.S.H., M.R.S.H., A.R.S.H., Affil.R.S.H.).

INSTITUTE OF BIOLOGY

We are advised by the Institute of Biology that a symposium under the title "Biological Aspects of the Transmission of Disease" will be held at the London School of Hygiene and Tropical Medicine, Keppel Street, London, W.C.1, on September 29th and 30th and October 1st.

A considerable number of distinguished scientists are taking part, among them several veterinarians including Dr. E. L. Taylor, Dr. C. Horton-Smith, Professor Lovell, and Professor Beveridge. Full details and a copy of the programme may be obtained from the General Secretary of the Institute of Biology at Tavistock House South, Tavistock Square, W.C.1.

BELFAST CONGRESS

Will those who are attending Congress kindly note that owing to our having been misinformed there was an error in last week's issue under the above title.

With regard to veterinary college dinners, may we make it plain that those wishing to attend the Dublin College Dinner are asked to write to Mr. J. C. G. McCrea, M.R.C.V.S., mentioned on page 602, while those who wish to attend the Glasgow Dinner are asked to write to Mr. R. F. Monie.

AWARDS FOR VETERINARY RESEARCH

The Animal Health Trust announces that it has extended its Wellcome Fellowship award to Mr. R. B. Holcombe, B.V.SC., M.R.C.V.S. to continue his work on bovine infertility at the Royal Veterinary College, Stockholm, and to Mr. D. Jenkins, M.R.C.V.S., to continue his work on population problems of partridges at Oxford.

The Committee has decided to make no recommendations for the award of a Junior Wellcome Fellowship for this year.

The Trust also announces the following awards of research training scholarships:—

Miss M. E. Edwards, B.SC., M.R.C.V.S., of Ammanford, Carmarthenshire, a graduate of the Royal (Dick) School of Veterinary Studies, Edinburgh, to work on the study of the immunology of parasitic disease at Cambridge under Professor Beveridge and Dr. D. O. Morgan. Mr. C. A. Finn, M.R.C.V.S., of London, a graduate of the Royal Veterinary College, to read for a B.Sc., special degree in Physiology at University College. Mr. L. W. Greenham, B.V.SC., M.R.C.V.S., of Bristol, a graduate of Bristol University, to undertake a post-graduate course for the Testamur in Bacteriology at Bristol University. Mr. R. R. Mackay, B.V.M.S., M.R.C.V.S., of Stirlingshire, a graduate of Glasgow University to enable him to take a D.V.S.M. course at the Royal (Dick) School of Veterinary Studies, Edinburgh. Mr. J. G. Woodrooffe of West Wickham, to work on Ectoparasites in domestic animals, specialising in ear mites of the cat, under Professor Bullough at Birkbeck College, (University of London).

RETIREMENT OF MR. R. J. SIMMONS

A correspondent writes:—

As reported in THE RECORD recently Mr. R. J. Simmons, C.M.G., C.B.E., M.R.C.V.S. has recently retired from the post of Adviser in Animal Health to the Secretary of State for the Colonies and has been succeeded by Mr. R. S. Marshall, C.B.E., M.R.C.V.S., DIP.BACT., D.V.S.M.

Mr. Simmons is a native of Fife, and qualified at the Royal (Dick) Veterinary College in 1923. During the First World War he served from August 1914 until April 1919 firstly in the Fife and Forfar Yeomanry and was later commissioned in the Royal Scots.

After qualifying, Mr. Simmons had a few months in practice and in September 1923 went to Uganda as a veterinary officer. In 1938 he succeeded the late W. F. Poulton as Director of Veterinary Services and in 1944 he transferred to Nigeria as Director. In 1948 he followed Mr. John Smith, O.B.E., D.V.H., M.R.C.V.S., at the Colonial Office.

During the last war, Mr. Simmons held several appointments in Uganda dealing with defence, refugees and other activities quite outside his duties as Director of the Veterinary Services.

91ST BIRTHDAY OF MAJ.-GEN. E. R. C. BUTLER

Major-General E. R. C. Butler, C.B., C.M.G., celebrated his 91st birthday in Kokstad, Natal, recently.

General Butler served with distinction in the Burma expedition from 1885 to 1887, and during the First World War was a director of Veterinary Services, with the rank of Brigadier-General. For his services to his country he was awarded the C.B. and C.M.G., and was mentioned in dispatches. He also holds many foreign decorations.

In 1921 General Butler moved to South Africa and farmed for some years at Glenrock, near Kokstad.

THE TOM NEWMAN AWARD

The Poultry Association of Great Britain announces that its Tom Newman International Award for 1955 will be made to Dr. H. Williams Smith, M.SC., DIP. BACT.(LOND.), F.R.C.V.S. The Award consists of a handsome medal and £50 sterling. It is given for what, in the opinion of the Committee, meeting in the United Kingdom, is the most important contribution to poultry husbandry research work published in the previous year. Instituted in 1948 by the Poultry Association of Great Britain, the Award has been won on five occasions by U.S.A. research workers and twice by United Kingdom research workers.

It will be made to Dr. Williams Smith primarily for his work on the control of Salmonella infections with particular reference to fowl typhoid.

UFAW NOTES

Veterinary section

The Annual Meeting of the Veterinary Section of UFAW will be held at Westham House, Barford, Warwick, on Thursday, September 29th, 1955 at 2 p.m. The meeting will be addressed by the President-Elect of the Section, Dr. N. S. Barron, M.R.C.V.S., who will speak on "Review of progress made in animal management in recent times." All members of the profession will be welcome.

The business meeting to elect officers, etc. will follow at 5 p.m.

Summer school

The annual Summer School will be held at Westham House, Barford, Warwick, from September 24th to October 1st, 1955. The programme will include expeditions to a dairy farm, Dudley Zoo and a slaughterhouse, and lectures by experts on the following topics:—animal behaviour, animals in zoos, slaughtering methods, animals in research, dairy husbandry, and whaling. Several members of the veterinary profession have kindly agreed to speak and all members will be welcome. The inclusive fee for the whole week is 5 gns. (reduced fee for students: 3 gns.) and full particulars of the programme may be obtained from:—Miss M. Williams, UFAW, 7a, Lamb's Conduit Passage, London, W.C.1.

FOWL PEST

As the result of the investigations into an outbreak of fowl pest at a hatchery in West Sussex, the disease was confirmed on 108 other premises; two of the outbreaks involved day-old chicks sent to the "clean" area. All told, about 48,000 poultry have been slaughtered and a substantial quantity of hatching eggs destroyed. The situation is under control.

It has not been possible to determine positively the origin of the outbreak at the hatchery, but it is suspected that it may be connected with the activities of a poultry slaughterer who visited the hatchery to remove live birds. It appears to be the practice of some poultry breeders and rearers to permit such callers, with their equipment, to enter the farm and move freely among the flocks. This is a risk of infection that should be avoided wherever possible. It is far better that the culls should be selected by the owner or one of his employees and taken to the dealer or slaughterer waiting outside the farm gate.

POISONS LIST ORDER, 1955

Attention is drawn to the Poisons List Order, 1955 (S.I. 1955 No. 1134), and the Poisons Rules, 1955 (S.I. 1955 No. 1135), which were made by the Secretary of State on July 22nd, 1955, and will come into operation on August 15th.

The effect of these Statutory Instruments is to add methylpentynol to Part 1 of the Poisons List and the First Schedule to the Poisons Rules.

Copies of the Poisons List Order, 1955 (price 2d. net) and of the Poisons Rules, 1955 (price 2d. net) may be obtained from the Stationery Office or through any bookseller.

JOINT CCTA/WHO TRAINING COURSE ON RABIES

During the period July 11th to 26th, 1955, the above Course took place at the laboratories of the East Africa Veterinary Research Organisation at Muguga in Kenya.

The discussion leaders were Dr. M. M. Kaplan, Chief Veterinary Public Health Officer, World Health Organisation, Geneva, who directed the Course, Professor Pierre Lepine, Chief, Virus Section, Pasteur Institute, Paris; Dr. Karl Habel, of the National Microbiological Institute, Bethesda, U.S.A.; Dr. Hilary Koprowski of the Lederle Laboratories, New York; Dr. A. Komarov, Director of the Government Veterinary Laboratories, Haifa, Israel; and Dr. Perez Gallardo of the School of Public Health, Madrid.

Thirty-eight veterinarians and medical officers were nominated by the Governments of the British, French

and Portuguese territories in East and West Africa, the Belgian Congo, the Union of South Africa, the Federation of Rhodesia and Nyasaland, Egypt, Ethiopia, Lebanon and the Sudan.

The Course was essentially a practical one in the latest laboratory techniques as applied to rabies and the manual instruction was interspersed with frequent group discussions and lectures.

PERSONAL

Births

BARR.—On August 5th, 1955, to Maureen (*née* de Rougemont) wife of T. F. F. Barr, M.R.C.V.S., D.V.S.M., of Bigpath Farm, Upham, Southampton, a son, Ian Barclay, brother for Jonet and Sheena.

HIRST.—On July 10th, 1955, to Audrey, wife of Basil Hirst, M.R.C.V.S., of 8, Connaught Place, Weston-super-Mare, a daughter (Sheridan).

NEIL.—On July 19th, 1955, to Lilian, wife of H. J. D. Neil, M.R.C.V.S., of Rosevean, Penzance, a daughter.

Marriage

BOYDE—BELL.—On June 18th, 1955, at St. Paul's Church, Egham, Hythe, Surrey, Carl Boyde, M.R.C.V.S., to Pamela Bell.

PROFESSOR F. BLAKEMORE

We very much regret to announce the sudden death on August 7th of Professor Frederick Blakemore, D.V.SC., B.V.SC., M.R.C.V.S., D.V.S.M., after a short illness. The news will be a great shock to his many friends, more especially as Professor Blakemore was in the prime of life.

He was born in 1906 having been educated at Hyde County School and the Liverpool Veterinary School, where he graduated in July, 1927. He obtained the diploma in Veterinary State Medicine two years later. After three years in general practice he became veterinary officer for the county of Glamorgan and one year afterwards was appointed veterinary investigation officer for the Eastern Provinces. Continuing in that service, he was appointed superintending investigation officer for England and Wales in 1946.

With the establishment of a school of veterinary science for the first time at Bristol University in 1948, Professor Blakemore was appointed to the Chair of Veterinary Studies. This appointment was one of the greatest importance in view of its pioneering nature, and it is common knowledge that Professor Blakemore made a brilliant success of it. From 1949 onwards he has been one of the two members of the Council of the Royal College of Veterinary Surgeons appointed by Bristol University. At the time of his appointment, he was not unaccustomed to academic work, having lectured in animal hygiene at the University of Cambridge and having been examiner in pathology for the R.C.V.S. since 1939. He was an examiner in the University of Reading also between 1941 and 1943.

Professor Blakemore's veterinary researches have covered a wide field; they include work on neurolymphomatosis (fowl paralysis); swine influenza, bacterial infection of bovine lungs, jaagziekte, fluorosis, lactation tetany, hexachloroethane treatment of liver fluke, maternal transference of immunity in bovines and the classification of streptococci, and joint-ill of lambs. He was the first to identify fluorine poisoning of stock in this country and has traced its relation to industry.

Within the sphere of the B.V.A. he was for many years honorary secretary of the Eastern Counties Division, and in this connection he was an active local hon. secretary at the Yarmouth Congress of 1939. In 1948 he was awarded the Dalrymple-Champneys Cup and Medal for outstanding work for the profession. He served on the Provisional Committee for the Torquay Congress in 1954.

Professor Blakemore's funeral took place on Thursday.

We shall publish a full memoir next week.

MR. HAROLD SCOTT

Mr. J. W. Nicholas writes:—

It came as a great shock to learn from the current issue of THE VETERINARY RECORD the passing of Harold Scott.

We in the S.V.R. have lost a very great friend. I have known him personally since the days of Heinemann and the Unregistered Practitioners Association. He was always ready with his help and wise counsel, and this loss will be felt by me personally and by the Division as a whole.

COMING EVENTS

September

4th to 10th. 73rd Annual General Meeting and Congress of the British Veterinary Association at Belfast.

8th (Thurs.). Summer General Meeting of Eastern Counties Veterinary Society at Cambridge. Tour of Veterinary School. President's Invitation Tea. Shipley Bowls Tournament.

ADDRESSES OF DISEASE INFECTED PREMISES

The list given below indicates, first, the county in which are situated the premises on which disease has been confirmed, followed by the postal address and date of outbreak.

Anthrax

Staffs. Pethills Farm, Winkhill, Leek (Aug. 3).

Suffolk. Falcons Hall, Rickinghall Superior (Aug. 4).

Fowl Pest

Lincs. 1, Pointon Road, Billingborough, Sleaford (Aug. 4).

Swine Fever

Berks. Plot 90, Golf Links Allotment, Reading (Aug. 8).

Derby. Hall Farm, Stanley (Aug. 4).

Dorset. Piggeries, Danes Meadow, Church Street, Upwey, Weymouth (Aug. 6); Merton Grange, Wheelers Lane, Knighton, Canford Magna, Poole (Aug. 8).

Herts. Tilehouse Farm, Theobald Road, Boreham Wood (Aug. 5).

Lancs. Clarkson Green Farm, Catforth, Preston; The Bungalow, Newsham Lane, Wood Plumpton, Preston (Aug. 3); Ormsgill Lane Piggery, Ormsgill Lane, Barrow-in-Furness (Aug. 5); Lower House Farm, Lower House Lane, Liverpool (Aug. 6).

Lincs. Manor Farm, Lenton, Grantham (Aug. 3).

Norfolk. Council Houses, Wisbech Road, Terrington St. John (Aug. 3); Leicester House, Great Massingham, Kings Lynn (Aug. 5).

Northants. The Laurels, West Haddon (Aug. 4).

Staffs. Moat Farm, Gnosall, Stafford (Aug. 5).

Suffolk. 8, Nuttery Vale, Hoxne; Courtlands, Rushbrooke Lane, Bury St. Edmunds (Aug. 8).

Surrey. The Beeches Farm, North Looe, Reigate Road, Ewell, Epsom (Aug. 3).

Sussex. Upstreet Farm, Ovingdean Grange, Ovingdean, Brighton (Aug. 4); Cambridge Farm, Upper Bevenden, Brighton, 7 (Aug. 8).

Warwicks. The Homestead, Wishaw, Curdworth, Birmingham; Butlers Road Farm, Long Compton, Shipston-on-Stour; Birch Tree Farm, Brownshill Green, Coventry (Aug. 3).

Yorks. 13, Cottage Holdings, Dunswell, Hull (Aug. 4); Highhouse Farm, Wales, Sheffield (Aug. 8).

CORRESPONDENCE

The views expressed in letters addressed to the Editor represent the personal opinions of the writer only and their publication does not imply endorsement by the B.V.A.

THE VETERINARY CLUB SYSTEM OF NEW ZEALAND

Sir,—With reference to Mr. Williamson's letter in THE RECORD of July 2nd, my similar opinions were given in your column in 1952. The worst feature of the scheme is that it lowers the status of members of our profession from professional men to that of mere employees of the farmers. Consequently, I found that in New Zealand, veterinary surgeons have not the standing that is usual elsewhere.

May I suggest that the remedy lies in using club systems as a transition to private practice as in Southern Rhodesia and South Africa, where a farmers' club attracts a veterinary surgeon by a guarantee to make up his emoluments to a total of usually £1,200 if he fails to earn that in fees, which are of the usual private practice scale as laid down by the respective veterinary associations. In these countries, the veterinary surgeon is his own master, is not controlled by the farmers nor is there the undesirable central organisation at the top, which provides lucrative administrative posts to the favoured few, who are mainly laymen. The New Zealand scheme is heading for nationalisation of the profession with the veterinary surgeon as a salaried employee, while the Southern African schemes are assisted private practice, with the veterinary surgeon his own master and a respected professional man.

I take this opportunity to confirm Mr. Williamson's ultimate paragraph in praise of the private practitioner in New Zealand.

Yours faithfully,
J. L. STEWART.

P.O. Magoebaskloof,
North Transvaal,
South Africa.

July 29th, 1955.

FALLING HAIR IN CATS AND DOGS

Sir,—A problem that troubles me a good deal in practice is that of falling hair in cats and dogs. Owners frequently ask me to do something about excessive and persistent moulting in animals of both sexes, neutred and entire.

I have tried B_{12}, vitamin H, thyroid tablets, and lately I have just implanted a spayed bitch with testosterone. In most cases results of treatment have been disappointing and I wonder therefore if any of your readers can suggest a specific curative treatment?

Yours faithfully,
W. B. BROWNIE.

1, Marsh Street,
Walsall.

August 5th, 1955.

FOOT-ROT AND THRUSH

Sir,—Within the past few months both the text and the advertisements in THE VETERINARY RECORD have referred to the treatment of foot-rot in sheep.

The suggestions and inference have been that the condition is difficult to control, and the "new" treatments are apparently acclaimed if they achieve some measure of success.

No condition is more simple to deal with and more easy to cure, provided the shepherd is properly instructed and is both meticulous and conscientious. Each individual member of the flock should be "sat up" and the feet pared as nearly to their normal shape as possible. Using an extremely sharp searching knife (a set of French hoof knives is ideal) all diseased and underrun horn and tissue are removed. Where possible undercut into healthy tissue, so that after a general swab with the dressing, pledgets of cotton-wool soaked in dressing will tend to be retained.

The dressing, *Liquor Ferri Perchlor Fort.* (the dilute formula is useless), is not readily taken up by the cotton-wool. The dressings should be renewed twice a week and it is seldom that more than a few

are required. "Thrush" in horses responds very readily to the same treatment. I have not come across either colleague or layman who is informed of the value and use of the dressing I have used with unfailing success in these conditions over several decades.

Yours faithfully,
V. BERWYN JONES.

PS.—I would not belittle the value and use of many of the "new" drugs and antibiotics, although I feel that sometimes their exhibition is unnecessarily expensive. For some time past I have contemplated the publication of a paper on "Foot Canker in Horses," describing some work in collaboration with Mr. R. E. Hirtes, M.R.C.V.S., and with Messrs. I.C.I. Ltd. This work, undertaken during my service with British Railways, confirmed that penicillin, used topically, would effect a lasting cure in cases of that revolting disease.—V.B.J.

Frocester Lodge,
Nr. Stonehouse,
Gloucestershire.

August 11th, 1955.

THE USE OF FORMALIN IN THE CONTROL OF FOOT-ROT IN SHEEP

Sir,—To corroborate the good results obtained by Miss Annie Littlejohn in the treatment of foot-rot in sheep with 10 per cent. solution of formalin and recorded in THE VETERINARY RECORD, August 6th, I should like to quote from the 1953-54 Annual Report of the Animal Research Division of the New Zealand Department of Agriculture (Director J. F. Filmer, D.V.SC.):—

"Australian workers have reported very good results in the treatment of foot-rot in sheep with a 10 per cent. solution of chloromycetin in methylated spirits. Three small trials conducted in New Zealand gave the following results:—

PERCENTAGE RECOVERIES

	10% Chloro-mycetin	10% For-malin	4% For-malin	Methy-lated spirits	Pared con-trols
Trial 1 :	%	%	%	%	%
One treatment	61	—	68	—	—
Two treatments	91	—	92	—	—
Trial 2	96	90	—	—	68
Trial 3	87	—	—	78	—

"Feet were pared to expose infected tissue before treatment in all cases. The chloromycetin solution and methylated spirit were applied with a 1 in. paint brush. The formalin treatment was given in a foot-rot bath. In trial 1 the second treatment was given to feet remaining uncured after 16 days. In the other trials only one treatment was given. Results were assessed approximately 14 days after treatment in each trial.

"Results suggest that 10 per cent. chloromycetin in methylated spirit produces approximately the same results as treatment with formalin solution in a foot-rot bath."

Yours faithfully,
W. W. HENDERSON.

Brackens Flat,
Captains Row,
Lymington, Hants.

August 7th, 1955.

DISEASES OF ANIMALS ACT, 1950—GREAT BRITAIN

Summary of Returns of Confirmed Outbreaks of Scheduled (Notifiable) Diseases

Period		Anthrax	Atrophic Rhinitis	Foot-and-mouth	Fowl Pest	Sheep Scab	Swine Fever
1st to 15th July, 1955		19	—	—	73	—	56
Corresponding period in	1954	10	—	—	9	—	65
	1953	11	—	—	111	—	93
	1952	36	—	29	5	—	22
1st January to 15th July, 1955		461	1	6	344	—	904
Corresponding period in	1954	160	3	12	550	—	889
	1953	445	—	26	619	—	1,826
	1952	310	—	437	126	1	579

TUBERCULOSIS ORDER OF 1938

The number of bovine animals slaughtered under the Tuberculosis Order of 1938 during the period 1st April to 30th June, 1955, was 337.